

Chemistry I: Midterm Review 2014

General Stuff

1. Density and formula
2. Define Accuracy and precision
3. Metric system

Matter and its changes

3. Describe the basic properties of matter in terms of mass and volume.
4. State the Law of Conservation of Matter and Energy
5. Define elements, compounds, and mixtures (provide 3 examples of each)

	definition	3 examples
element		
Mixture		
compound		

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6. List the physical and chemical properties metals, nonmetals and metalloids.

	Physical properties	Chemical properties
metals		
nonmetals		
metalloids		

7. Where are metals, nonmetals, and metalloids on periodic table?

8. Provide 5 examples of chemical change

9. 4 things to start a chemical reaction

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10. Define physical and chemical changes and list 3 examples of each

11. Define a Precipitate

Atomic structure

12. Define the following terms:

a) An atom is

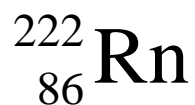
b) An Isotope is

c) The 3 basic atomic particles are

d) Atomic number is the number of

e) Atomic mass is the sum of

f) Explain the following isotopic symbol and abbreviated version.



13. Explain the significance of Ernest Rutherford's gold foil experiment

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14. Define the quantum model of the atom.

Arrangement of Electron in Atoms

15. Define the following terms:

- a) Bright line spectrum
- b) One quantum of energy
- c) One photon of light energy
- d) Valence electrons

16. Electron configuration

17. Orbital notation

The Periodic Law

18. the Periodic Law states that

19. Define the following terms:

- a) Ionization energy
- b) Atomic radius
- c) Electronegativity

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20. Describe the trends of the following periodic properties as you go down a family / group on the Periodic Table

	Trend top to bottom	Trend left to right
Ionization energy		
Atomic radius		
Electronegativity		
Reactivity		

21. Explain each of the following formulas. Define the variables and state the mathematical relationship

$$E = hf$$

$$c = \lambda f$$

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Chemical bonds

22. Define the following terms:

- a) Coordinate covalent bond
- b) Double/ triple covalent bonding
- c) Polyatomic ions (radicals)
- d) Ionic bonding
- e) Define cation and anion

23. Be able to determine polarity of covalent molecules (molecular polarity)

24. Determine polar and non-polar bond using electronegativity values

Chemical Composition:

25. Define the following terms:

- a) Law of definite composition
- b) Law of multiple proportions
- c) Molar mass

a) Families	b) Periods	c) Alkali metals	d) Alkaline earth metals
e) Transition metals	f) Halogens	g) Noble gasses	h) Lanthanides
i) Actinides	j) "s" block	k) "p" block	l) "d" block

27. For each capital letter above: Write the **e-config** , **Lewis dot symbols** and **oxidization #'s**

element	e-configuration	Lewis Dot	Ox. #
A			
B			
C			
D			
E			
F			
G			
H			
I			

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J			
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28. Draw the following molecules and determine their shape

Molecule	Lewis structure	Geometry
CH ₃ CH ₂ OH		
SCl ₂		
CH ₃ CH ₂ COOH		

29. Draw examples of the following ionic bonds

Ionic Compound	Lewis drawing
LiBr	
BaCl ₂	

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Mg_3N_2	
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30. Write correct formulas for the following compounds:

Potassium oxide	Carbon tetrachloride	Diphosphorus pentoxide
Aluminum sulfide	Dinitrogen oxide	Silver sulfide
Copper (II) nitrate	Ammonium phosphate	Ferrous sulfate
Lead (IV) oxide	Cupric hydroxide	Stannous bicarbonate

31. Correctly name the following compounds:

$\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$	Cr_2O_3	$\text{Pb}(\text{NO}_3)_2$
Ag_2CrO_4	P_4O_{10}	NBr_3
$\text{Al}_2(\text{CrO}_4)_3$	$\text{Sn}(\text{Cr}_2\text{O}_7)_2$	N_2O_4

32. For the following calcium compounds: write the formulas and find the % of calcium in each
Calcium phosphate

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Calcium nitrate

33. **Calculate the empirical formulas** for the following

52.2% **C** 13.00% **H** 34.80% **O**

26.56 % **K** 35.41 % **Cr** 38.03 % **O**

34. **Calculate the molecular formula** for a compound that is 49.3% **C** 6.9% **H** and 43.8% **O** with a molar mass of 146 g/mol

35. **Complete, identify and balance the following chemical reactions:**

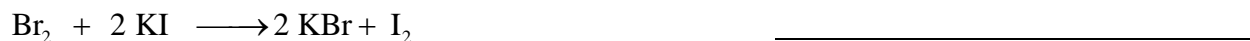
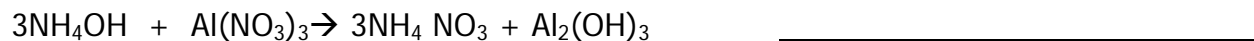
Composition (synthesis), Decomposition, Single Replacements, Double Replacement, Burning



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Identify the following reactions by type.



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Explain each of the following formulas. Define the variables and state the mathematical relationship

$$E = hf$$

$$c = \lambda f$$